



## Risk Control

# Electrical Surge Protection

## What is Electrical Surge?

Surges, or transients, are brief overvoltage spikes or disturbances that can damage, degrade or destroy electrical and electronic equipment (including life safety equipment) within any commercial, industrial or manufacturing facility. Surge protective devices (SPDs) limit transient overvoltage and help avoid potential damage and premature failure by preventing the transient from reaching the connected equipment.

Most people think of electrical surge protection in relation to lightning strikes. However, it is estimated that 80% of electrical surge-related events initiate inside a facility, not outside. Electronics, which are found in modern equipment, generate many of the spurious signals impressed upon the site's electrical distribution system.

### What is at risk?

Surges or transients can damage, degrade or destroy the sensitive electronic equipment in offices or businesses resulting in:

- Equipment damage
- Equipment downtime
- Loss of revenue
- Loss of productivity

### What are the symptoms of surge damage?

There are several symptoms to look for to determine whether surges are affecting your office or business.

- Computer lock-ups or latch-ups
- Unexplainable data corruption
- Equipment shutdown
- Flickering lights
- Premature failure of electronic ballasts or printed circuit boards

There is no such thing as a "transient free" facility. Many people do not realize that their company's productivity and profitability can be significantly impacted by the effects of transients. These problems result in significant lost profits to U.S. businesses every year.

### The challenge: infrastructure

Many business owners operate electrical distribution systems that are more than 25 years old. Medium and high voltage three-phase systems past this age may contain obsolete switchgear and motor control centers. Significant damage to such equipment usually requires replacement. Older electrical equipment raises questions about the extent of periodic maintenance and testing being performed.

The vast majority of businesses and buildings today have equipment that is either fully electronic or controlled by electronic (digital) controls. The more modern ones are illuminated by LED lighting circuits. All such equipment is highly susceptible to surge damage. In addition, electronic equipment generates its own electronic signature, a form of surge, which can disrupt power supply signals and cause loss of data.

National Electric Code, NFPA 70 Article 285, addresses installation requirements of surge protective devices for in-house electrical distribution systems not exceeding 1,000 volts. There are currently no standards that cover SPDs used for medium voltage (> 10 kV to 100 kV) applications inside customer facilities. Qualified installers tend to treat these applications like any other low-voltage power application (but obviously with higher-voltage SPDs).

**The solution: 3 tiered levels of protection**

An integrated solution requires the three-tiered approach. SPDs should be installed on all systems susceptible to electrical transients, including phone/fax lines, cable and local area networks.

- **Tier 1** – Install an SPD on the electrical service entrance equipment to protect against power surges generated from outside the facility. Loss of phase protection should also be installed at the service entrance. A loss of phase event to a three-phase system, if prolonged, will overheat and damage motors.
- **Tier 2** – SPDs should be installed at each distribution panel, supplying critical applications or sensitive electronic equipment to provide protection against internally generated surges.
- **Tier 3** – SPDs should be installed locally at each piece of equipment requiring additional protection. Which pieces of equipment? Identify those key production, process, medical imaging or treatment objects that are crucial to the normal operation of the business.

This three-tiered approach will help provide your facility with maximum protection against equipment damage resulting from electrical surges. Evaluation, specification and installation of SPDs should be performed by a qualified individual or organization.

To learn more about how to help your clients manage risks and increase efficiencies, please visit [cna.com/riskcontrol](https://cna.com/riskcontrol).